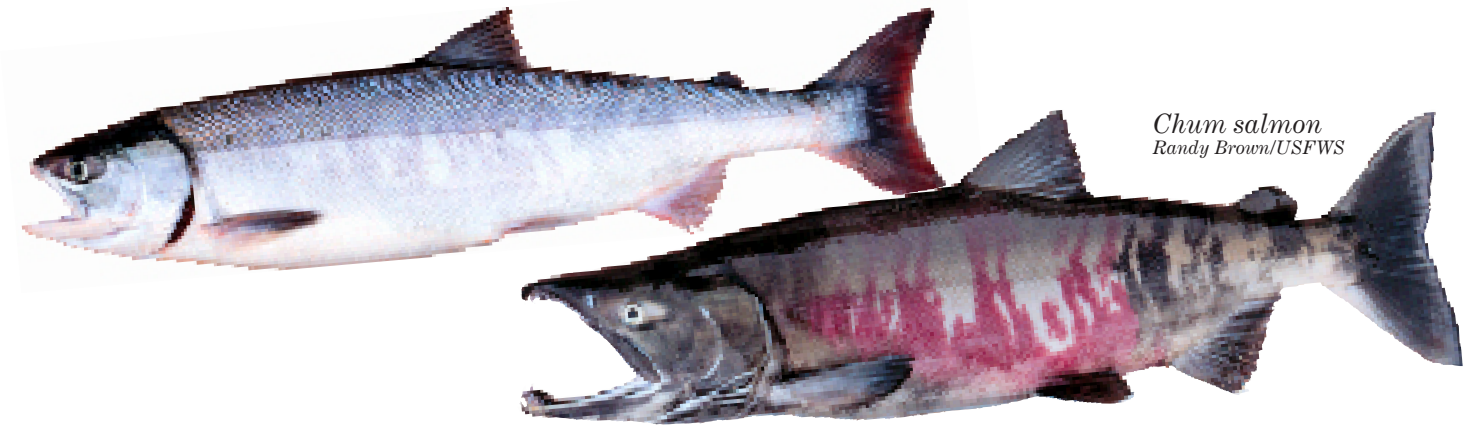
U.S. Fish & Wildlife Service

Contaminants in Salmon

Study Plan
Alaska Region



Chum salmon
Randy Brown/USFWS

Background
Fisheries and subsistence managers need to determine if contaminants are a threat to the health and viability of salmon populations. Many Alaskans are also concerned about the quality of subsistence foods and whether those foods are safe to eat, but no contaminants data (except for mercury) exist for Yukon River or Kuskokwim River salmon. To help answer questions about contaminants and the health of salmon populations, the U.S. Fish and Wildlife Service (FWS), will study chinook (*Oncorhynchus tshawytscha*) and chum salmon (*O. keta*) from the Yukon and Kuskokwim rivers in 2001.

Objectives
We will measure values of a broad range of contaminants (described under the *Analyses* section) in chinook salmon and chum salmon from the Yukon and Kuskokwim rivers. We will estimate the effects of these contaminants on individual salmon and salmon populations and work with public health agencies to evaluate the implications to public health.

Sampling
We will sample 10 male and 10 female chinook and chum salmon at each of three sites, including Rampart Rapids and Beaver on the Yukon River, and Bethel on the Kuskokwim River. Males and females will be analyzed separately because there are sex-related differences in concentrations and distribution of contaminants. Upriver sampling sites on the Yukon River were chosen to reduce the variation in data which would result from sampling the more mixed-stock (upriver and lower river spawners) fishery of the lower Yukon River. Reduced variation increases our ability to make conclusions from the data and allows use of a smaller sample size. Also, upriver spawners have a higher fat content than fish which spawn in the lower river. This is important because some fat-soluble pollutants may be more elevated in fish with a higher fat content.

Why study contaminants in salmon?

- *Chinook and chum salmon stocks are declining in the Yukon River*
- *No contaminants data exist for Yukon or Kuskokwim river salmon (except mercury)*
- *Salmon are an important subsistence food*

Analyses
Each fish will be analyzed for a range of contaminants including metals; persistent organic pollutants (POPs), such as organochlorine pesticides (for example, DDT); and polychlorinated biphenyls (PCBs). We will measure indicators of possible contaminant effects including histology, reproductive hormones, physiologic biomarkers, fatty acids, vitamins, and sex chromosome/gender abnormalities. Each fish also will be evaluated for the presence of the parasite *Ichthyophonus hofferi*, which causes illness and mortality in chinook salmon.

Public Health
It is the responsibility of the FWS to maintain the quality and quantity of wildlife populations used for subsistence on National Wildlife Refuges in Alaska. Investigating the potential impact of environmental contaminants on anadromous fish is one way we can fulfill this important mission. Although the FWS expects this study to be of great interest to subsistence consumers and public health officials, the FWS does not perform human health risk assessments. The FWS will use data produced by this study to assess salmon population health and viability. Our results will be used by organizations specializing in public health to determine the implications of consuming salmon from the Yukon and Kuskokwim rivers. Furthermore, the data collected in this study will be provided to all interested parties.

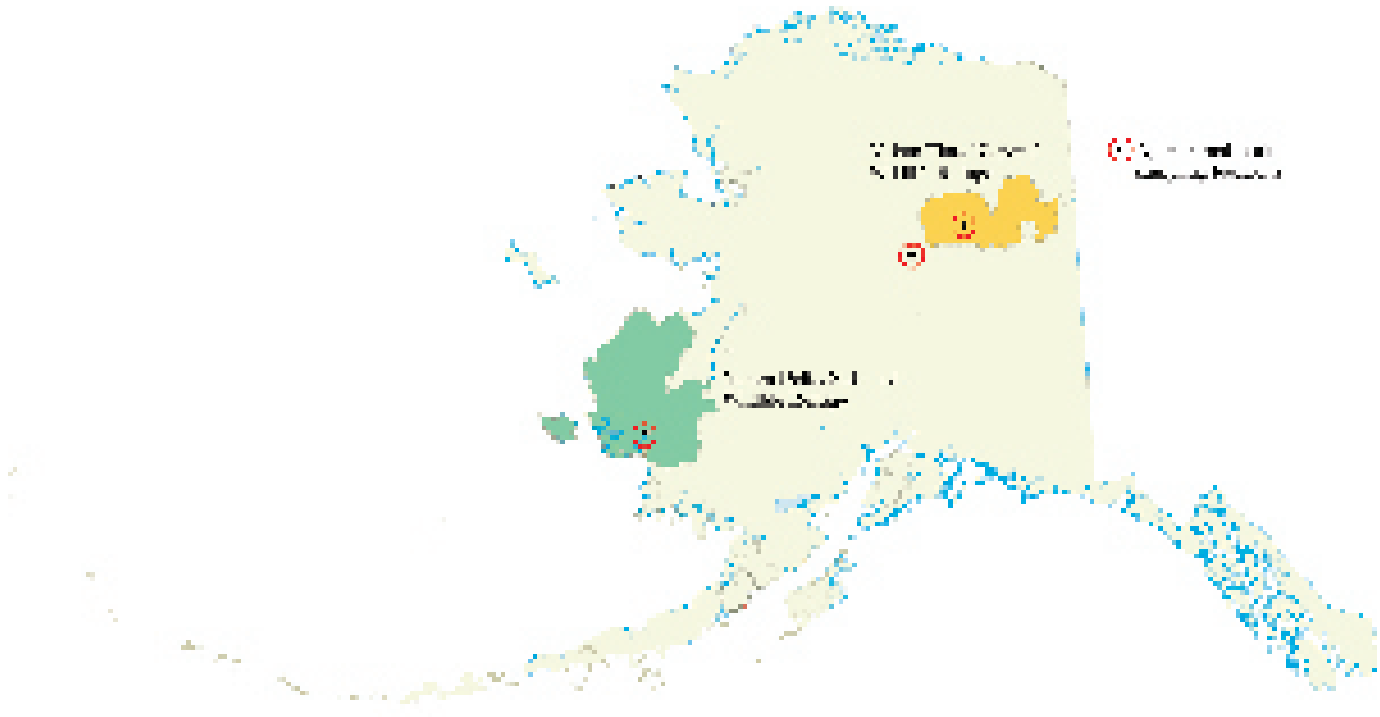
Cooperators
The FWS Environmental Contaminants program will conduct the study in cooperation with Yukon Flats National Wildlife Refuge (NWR), Yukon Delta NWR, FWS Fisheries program, Alaska

Department of Fish and Game, Alaska Native Tribal Health Consortium, Alaska Department of Health and Social Services, U.S. Geological Survey (Biological Resources Division), Western Fisheries Research Center, University of Washington, and University of Idaho.

Communication
We anticipate interest in this study because it is the first study to analyze a broad range of contaminants in Alaska salmon, and salmon are an important subsistence resource. We intend to communicate our plans and study progress to all interested parties. Information will be provided to residents of Yukon River villages in and near Yukon Flats NWR by writing personal letters to tribal chiefs in sampling areas and through the Yukon Flats NWR's newsletter. During field work, we will meet with Beaver residents and the Kuskokwim River Working Group, and local residents or students will participate during sample collection. Following data analysis, project results will be distributed through meetings, articles and/or presentations. Additionally, we will produce a poster and report detailing the study results, and we will pursue publication of the results in professional journals.

Schedule
Fish will be collected from June to August 2001. A final report will be completed six months after the final data are received from analytical laboratories; at the earliest, the final report will be completed in Fall 2002. Study results will be made available to any interested individual or groups.

Budget
Approximately 81% of the study costs will be spent on analytical chemistry and measurement of effects such as biomarkers and pathology; 9% will be spent on project logistics, such as purchase of sampling jars, equipment, travel, and gasoline; and 10% will be spent on administrative costs.



Approximate salmon sampling locations from left to right–Bethel, Rampart Rapids and Beaver.

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1 800/344 WILD
http://www.fws.gov

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For more information please contact:
Keith Mueller
907/456 0215
keith_mueller@fws.gov
Angela Matz
907/456 0442
angela_matz@fws.gov
U.S. Fish & Wildlife Service
101 12th Avenue, Box 19, Room 110
Fairbanks, AK 99701

Visit the Contaminant Program home page:
http://www.r7.fws.gov/es/dec.html